American Electro-platers' Society

(An Educational Society)

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MONTHLY REVIEW

OCTOBER, 1914

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I shall pass through this world but once. Any good thing, therefore, that I can do, or any kindness that I can show to any human being, let me do it now. Let me neither defer nor neglect it, for I shall not pass this way again.—*Amiel.*

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MONTHLY REVIEW

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Vol. 1 OCTOBER, 1914 No. 5

Editorial

A COMMITTEE ON STANDARDIZATION.

On all subjects discussed there is always a diversity of opinion. This is as true at the meetings of the various branches of the American Electro-platers' Society as with other bodies. Considerable discussion has been held recently on nickel solutions, but judging from reports as published in former numbers of the Monthly Review, and also in the present issue, no definite conclusions of value have been arrived at. One branch arrives at certain conclusions while another branch contends that the directly opposite is true. Is it not time for the Society, as a whole, to appoint a committee to standardize and systematize the making, and correction of changes, in a nickel solution? As the majority of platers have not the time at their disposal or the means for carrying out research work, it is suggested that this committee should consist of our honorary members who are chemists or electro-chemists. Professors Bancroft, Miller, Childs, Burgess, Watts are gentlemen of high standing in educational work and would comprise a committee whose conclusions would be of value and could be depended upon for exact knowledge.

THE RUSTING OF IRON AND STEEL.

This paper is presented to our Monthly Review by the Bridgeport Branch as the result of the joint efforts of its members—W. G. Stratton, G. E. Hopkins, W. S. Elwin, William Thompson, P. A. Willett, John O'Neill, H. M. Dawson and C. Wyrtzel, and includes some of the vital points of a most interesting discussion in which George H. Hogaboom, our ex-president, was an active factor.

The rusting of iron and steel has always been a source of considerable trouble to all manufacturers of goods made from this metal, involving to the plater the handling of an immense variety of articles.

Broadly stated, rust is the result of the contact of moist air and metal. Iron or steel does not undergo any alteration in dry oxygen or in pure air at the ordinary temperature. In moist air, however, it becomes coated with ferric hydroxide, or iron rust, this oxidation being greatly accelerated by the presence of carbon dioxide, acid vapors, acids and ammoniacal salts. Rust has also

been described as the result of the formation of a subsalt claimed to be first a carbonate of protoxide, passing to a hydrated protoxide through decomposition. Rusting once commenced proceeds with increasing speed to the breaking down of the entire metallic structure. Carelessness in handling and storage are largely responsible for the plater's rusting troubles.

The causes of rust having thus been set forth, it would seem that one of the first points to be considered would be to provide a dry, well-ventilated place for raw stock, for steel, having once become rusty, can only be cleaned with difficulty and in many cases, it is impossible to restore it to its first even surface condition.

Differences in Amount of Rusting, According to Surfaces.

Rusting proceeds with greater rapidity on some surfaces than others. Rough or sand-blasted surfaces are more readily attacked than smooth surfaces. On rough castings and stock the pores of the metal are of an open character and thus more exposed to atmospheric attack. Sand-blasted articles offer a similar rough surface and microscopic examination has shown that small particles of the sand are actually driven by the force of the blast into the metal pores and the plater endeavoring to cover such surface with metal will find considerable difficulty in plating sand particles satisfactorily. Similar liability to quick rusting is noted when the metal is rough polished on a dry, coarse emery wheel and allowed to stand. On highly polished surfaces the grain of the metal is laid flat and glazed over and the pores closed up. The waxes and greases used in obtaining the high polish are forced into the metal and form rust preventives. On small articles, when tumbled in plating barrels, the points and edges are frequently worn down so that the nickel coating is too light and broken in small points and rusting will start at the edges.

In brush brass steel in some places pumice is used and the pumice particles cut deeper into the plate producing a condition analogous to sand-blasting and offering a surface inviting atmospheric attack.

It has been noted also that steel immersed in gasoline is liable to rust more quickly owing to the presence of acids in the liquid.

Precautions in Storage

It is inevitable that at certain seasons of the year goods have to remain in storage before plating for longer times than usual. Stock should be stored in a dry, well ventilated place. The plater should insist that work he has to handle should be protected from dampness from the time it leaves the press, for all troubles due to rust will be eventually charged up to the plater. Goods must be kept dry and should not be packed on shelves near a window or door.

Preventive Measures Against Rusting.

It seems to be generally agreed that after finishing the goods, they should be rinsed in a strong solution of fish oil soap, or in good soap of similar character, before the final clean hot water immersion and then they should be dried in hot sawdust. The soap film protects the steel for a long time. Small pieces that are plated and tumbled are dipped in a 10% solution of soap and placed in a dryer without rinsing. Clean castings and stock are the best to work with under all circumstances whether for plating, polishing or machining and if this were borne constantly in mind and proper care taken, 50% of the rust troubles would be eliminated. It should be remembered that if there is rust in the base metal, it will work out and show under the plated article and bring about a "spotting out" condition. If the work should rust, it should be cleaned by pickling and then have oil applied to it.

Care in Handling.

Care must be used from the time the steel is made until it is delivered to keep it clean and dry. It must be packed most carefully. Cleanliness, care in handling and exclusion of moisture will reduce the trouble of rusting on steel work to a minimum.

The Handling of the Finished Work.

The rusting of metal through handling is a common feature and is frequently due to the physical characteristics of the operators. There are men who cannot handle brass or any other metal without leaving finger marks on the surface. Such men should wear cotton gloves when handling finished work. Every precaution must be taken in handling the finished goods, especially during the hot weather, to avoid getting sweat marks of this kind on the work during its assembling. Talcum powder is an excellent preventive and if used freely will keep the fingers from leaving marks on the work. Electric fans are beneficial in keeping the help cool and money expended in this manner is a good investment. For some classes of work for assembling, it is recommended that it be dipped in soap water and dried or rolled in hot sawdust for the removal of finger marks. A foreman plater should educate his men as to the proper way to handle the work.

In handling small articles, it is advisable to insist that the packers do not use their hands in filling the packages, but fill them with a metal scoop.

The Wrapping of the Goods

After the parts have been polished, they must often lay for some time. It is recommended that they be kept free from finger marks and coated with a non-acid mineral oil. Carelessness by using an oil that is not entirely free from acid will result in more destructive corrosion than that obtaining from the ordinary free

rusting. They can then be laid out in trays lined with paraffin paper and finally wrapped in similar paper when they can be stored away and kept free from rust indefinitely. In packing for shipment, the goods should be placed in paper-lined barrels after being well wrapped in paraffin paper and if proper care is taken in the selection of the paper stock so that it possesses no impurities, such as sulphur, the goods should be able to travel to any part of the world in perfect condition. Trouble from tarnishing and rusting in foreign shipments in many cases has been traced not to the plating room as anticipated, but to the shipping room, where cheap sulphur-laden paper has been used for wrapping the articles. The same danger may also be anticipated from the use of certain classes of low-grade woods in the boxes or barrels.

Missionary Work to be done by the Plater.

The plater can do much missionary work that in time will be of great benefit to himself. If, whenever a box of rusty goods comes to his department to be finished, he would call attention to it and explain what it means in labor cost as well as the necessarily resulting inferior finish that will be obtained, he would in the course of time impress upon the heads of the departments the need of keeping goods free from rust throughout the entire course of manufacture. A man's reputation is largely dependent on the quality of work he produces, in relation to the cost of producing it. To be successful, he must watch carefully every point that is going to help him turn out good work at a low cost. His solutions may be in perfect condition, but if the work he receives is in poor condition, the skill and care he exercises over the condition of his solutions and the work of his operators will be made null and void. Whether he gets the proper credit for missionary work of this kind is not the point to be considered. The saving of trouble to himself is worth the effort. He should take pains to inform himself of the nature of rust outlined in the preceding paragraphs, the effect of acids in accelerating rusting conditions and the value of oil soaps as preventives. He must not take it for granted that oiling goods is always a solution of the rust problem. It is frequently not at all practical to keep oil on the various articles as they come through the manufacturing processes and yet some of the very articles that should be kept free from oil may be those that give the most trouble on account of the rusted condition in which he receives them. For this reason, he should call for care in the manufacturing processes prior to his receiving the goods.

THE SPOTTING OUT PROBLEM.

By Louis Schulte, Chicago Branch.

Over the "Spotting out trouble" in the Electro-plating Industry, all over the world, much has been written that would fill thousands of pages and just as many questions have been asked to overcome this trouble. Innumerable suggestions have been made and all up to the present have proven failures.

The old theory why articles plated in an alkali solution containing cyanide on metal goods, especially porous castings, is that some particles of the cyanide would remain in these pores which could not be thoroughly rinsed, thereby causing spotting out, and especially solutions with higher concentration of cyanides would have a tendency of spotting out.

I therefore state that the above theory is being and has been adopted by every plater, and this is the reason why no remedy could be found. To make it more clear, I will try to explain how I investigated and succeeded in overcoming this trouble.

When I plated castings in a brass or bronze solution in large quantities for one week or one month I had no spotting. The solution was then at rest for a while and the next new lot of castings plated in the same solution without any addition to the solution showed spotting out. This led me to believe that it was due to the foundry, either in the making of the metal or possibly in using new sand for the moulds, therefore I put aside some of these castings, and after several months plated the same castings in the same solution and I was surprised to find that the same castings did not spot. While I was working at that time with quite a large amount of work in the solution for another manufacturer, I took the balance of the castings set aside several months previous and plated them in the solution and they spotted again. This was a puzzle to me.

Then I started a long series of investigations still believing that cyanide was doing the spotting, and therefore used all kinds of acids, and chemicals, some mixed, others alone; and everything possible was applied to submit the plated articles in an electrolyth with direct current, also with positive current, and also alternating current, but whatever I tried I could not remove spotting from such plated articles, by an acid or acid chemical combination rinsing.

I found that ordinary water, cool or hot, would remove the spots sometimes for a period of from 20 to 48 hours. This led me to investigate and study whether there was any possibility of metal deposition or alloys which would dissolve in water but not in chemicals or acids.

Knowing the outlines of chemistry and that metals of the alkaline earth, such as kalium, sodium and calcium, will dissolve in water, this led me to experiment, adding first caustic potash to a cyanide plating solution. After investigating in a copper cyanide solution, before experimenting, it worked excellently without spotting. After adding one pound of potash to 10 gallons of solu-

tion, the goods spotted all over. The same experiments were made in brass and bronze solutions with the same results, and the goods spotted terribly. In the brass solution the color was changed to white and in the bronze solution to a grayish green. To bring the brass solution back to its proper color I had to add a large amount of copper carbonate dissolved in cyanide and still the goods were spotted.

I was then confident that the spotting out was nothing but an electro-deposition of metals of the alkaline earth and its alloys from the containing electrolyte. To satisfy myself, I made the same tests over again, using new solutions, to which I added caustic soda, with the same results of spotting, and consequently it was clear to me that the facts recently published in our trade journals, whether to use cyanide of potassium or cyanide of sodium, was immaterial.

Knowing now how to make a solution which would spot out, it was up to me to find out how to overcome this spotting in the solution containing the alkaline earth. I succeeded, knowing that potassium or caustic soda will decrease cyanide in any solution. I added double or triple amounts of cyanide to the solution, as potash previously added, and the result was I overcame the spotting.

Therefore, "**Spotting Out**" is not the result of two concentrated cyanides but simply a matter of a difficiency of cyanide. It is well to know that a cyanide solution will contain sooner or later a large amount of potassium carbonate formed by the decomposition of the cyanides and through the electric current and through oxygen in the air, any older solution will always contain more potassium carbonate than a new one and consequently the older solution spots as a rule more quickly than a new solution.

I found it expensive to add large amounts of cyanide to the solution to simply overcome the spotting out. At the same time I followed the extreme, for goods plated in such an electrolyte peel and blister very easily. Therefore I have made it a practice to cut down or precipitate from time to time the potassium carbonate from the solution. This can be done with cyanide of barium or cyanide of calcium (cyanide of calcium cannot be purchased in the country). As these chemicals are very expensive I used also single barium salts, such as nitrate of barium or chloride of barium or a mixture of the two; dissolving a quantity of these barium salts in hot water and pouring same into the solution in the evening, stirring it up well. In the morning, I removed by cyphoning the solution from the settlement or residue which can be thrown away, as it is useless.

In using a silver solution this settlement should be strained through a filter. No fear should be entertained that these barium salts will cut or precipitate any metals. As to the exact amount of cyanide wasted, by adding these single barium salts I cannot say up to today. Put the good solution back into your tank after the residue (which is only carbonate of barium and undissolvable

in water) has been removed; to this add a larger amount of cyanide of sodium or cyanide of potassium or a mixture of the two to your solution and the spotting is overcome.

The reader may think that it should not be necessary to remove the carbonate of barium from the solution. This is true, if deeper tanks are used without stirring up the residue, as I have found that if this carbonate of barium comes into contact with the electric current between the anodes and cathodes it may possibly redissolve and thereby deposit.

Instead of cyphoning the solution from the sediment, especially from large tanks, I have with success buried this carbonate as well as other impurities by sifting clean sand into the solution after the solution was at rest for a day or so and have found this method as good as filtering.

It is very surprising that we platers have not discovered this trouble before, as the majority of us know from experience that goods plated with a higher current and especially in a mechanical plater where the higher current and as a rule a higher percentage of cyanide is used, very little or no spotting occurred; and as a rule goods plated in a mechanical plater are not carefully rinsed as goods plated in an open tank.

This led to the investigation to find out if electric current had something to do at the same time with spotting out. After a long series of trials, I found that the electric current had not only a direct but also an indirect effect of spotting out, inasmuch as the low current will allow the deposit of the metals of the alkaline earth much easier than the higher current, for the simple reason that the higher current forming a larger amount of hydrogen by which water is set free as stated above, water is a solvent of the metals of the alkaline earth. This seems to furnish the reason why porous metal goods spot out more than flat articles, because the hydrogen on metal goods will form on the higher parts of the metals where they are closer to the anodes or current and in the lower potential parts of the metals there is little or no hydrogen formed. Metallic sodium or metallic potassium together with its impurities or alloys will deposit and after drying and submitting to the sunlight or the moisture in the air will appear in dark spots.

During my investigation I found that a brass, bronze or copper solution which I always used warm, at times when in a hurry and had to plate some goods in the solution, even when the solution was cold, in many instances the goods spotted.

I may state here that many manufacturers are opposed to using warm cyanide solutions, believing that more cyanide would be wasted, but the platers know the contrary, as long as the solution is not overheated. Cold cyanide solution always needs new additions of cyanide to overcome the resistance of crystallization.

When a brass, bronze or copper solution plates slowly and the goods become spotted, look first at the anodes in your tank. If the anodes are covered with a green deposit in copper solutions

then you have sufficient metal, and cyanide should be added. If in a brass or bronze solution the anodes are covered with a white or grayish deposit, more cyanide is needed. At the same time the color indicates that you have an excess of zinc in your solution and copper with cyanide is the next thing to add, providing that this white deposit is not caused by an excess of sodium bisulphite, which shows up often in solutions low in cyanide. But in case the anodes are covered with a dark deposit which, in many instances, cannot be removed by scouring or acid dipping, in this you have the finest spotting solution, low in metal and low in cyanide, but plenty of carbonate of sodium and carbonate of potassium in same. My belief is that the black deposit on this anode is nothing but metals of the alkaline earth, as this metal will deposit in a solution low in cyanide by either current, positive or negative.

It may seem strange to some of the readers why a larger amount of free cyanide will prevent the deposition of the alkaline earths and a deficiency of cyanide will not.

Therefore I state that a rich copper solution with three times the amount of cyanide will prevent even the deposition of copper.

I will not forget to mention that solutions containing large amounts of ammonia will spot more readily than solutions free from ammonia.

I admit that there are spots at times similar to cyanide spots on metals if the cyanide has not been thoroughly rinsed from same, but these spots can be easily recognized as they are different in appearance and easily removed by a method of rinsing. The same applies to spots caused through over-steaming potash or lye tanks and thereby filling the air with particles of same which settle on the articles, causing discoloration and spotting.

I hope that the above article will be of benefit and assistance to all my plated friends and would suggest that, each and every one of you try these experiments and convince yourselves of the correctness of same.

A CONDITION, AFTER WHICH, WHAT?
OR
FOOLISH THOUGHTS—BUT—?

By Walter T. Donnelly, Chicago Branch.

Cast of Characters.

Cy. A. Nogen.....Plater Foreman, Hypo Mfg. Co.
Emery Glue .....Foreman Polisher, Hypo Mfg. Co.
Scrub Brush .....1st Ass'nt Plater, Hypo Mfg. Co.
Big Stick .....Superintendent, Hypo Mfg. Co.
O. Besity .....Proprietor, Hypo Mfg. Co.
Super's—50 Polishers—12 Platers, Helpers, and etc.

ACT I.

Enter Cy. A. Nogen. For ten years things have gone well in my department, outlook bright, and I am an active member of the A. E. S.

(Business of starting the day's grind on the 11th year of faithful service.)

Enter Emery Glue. For five years things have gone well in my department, containing 50 Polishers and Buffers. (Deep thought.) Why not consult Big Stick on amalgamation of both departments with I as the sole head. I could surely succeed with the help of Scrub Brush, although I have never served a day at this branch in all my long and tempestuous career. I'll do it.

Enter Big Stick and in a neutral corner is approached by Emery Glue. Business of commenting on weather (sizing up good or bad nature of Big Stick), finds same satisfactory and launches his scheme. Emery Glue is invited into office, where details are gone into. Big Stick promises to let E. Glue know after he has had a talk with O. Besity. Talk over proposition proposed by E. Glue.

O. Besity. What would the combination save me?

Big Stick. Cy. A. Nogen is drawing $35 per week. Add two or three dollars a week to E. Glue's salary and two dollars to Scrub Brush's salary, a saving of $30 a week, and the trick is done.

O. Besity. Let the order be entered at once.

Big Stick. (In conversation with Cy. A. Nogen.) We have decided to make a change in your department, so on and after a certain date your services will no longer be required. I am sorry but surely a man of your ability, etc.

Cy. A. Nogen. Why this is a surprise. Has not my work been satisfactory, and etc.?

Big Stick. Entirely so, but for economy, we have decided, etc. We will and can highly recommend you to any employer in need of such a valuable man, etc.

Exit Cy. A. Nogen to rub elbows with the likes of E. Glue, Scrub Brush and their kind, seeking a position, often times carrying a salary much below his former position.

Big Stick (instructing E. Glue as to his new duties). And by the way, I believe it would be a good thing for you to join the A. E. S. and brush up on your new duties.

E. Glue makes application for membership in A. E. S. and is duly accepted and nominated, **although he never served a day at plating in h s life.**

The above is an every-day occurrence, and the writer believes that the A. E. S., if it looks to a permanency, continued prosperity and a career of usefulness, demanding the continued respect of the rank and file, would do well to take heed, discuss this matter at the meetings, and solve this perplexing problem.

I can point out at least (without any fear of contradiction) a half dozen members of the Chicago Branch who have never served a day at Electro Chemistry in their careers, and do not know the action of the simplest chemicals in their daily use, or how they are made, but when they get in a rut, buy the necessary information.

I write the above with no spirit of jealousy, but simply of a desire of having the best interests of the A. E. S. at heart, for

surely you can see if the above state of affairs is allowed to continue (I mean the acceptance of such membership), then you strike at your very vitals. For those of the A. E. S. who are qualified, will become lukewarm, drop from membership, and you will wait five years until Scrub Brush is eligible.

But, say you, we gain what we have lost in Emery Glue. Granted, but such membership lowers the plane of intelligence of the rank and file, and you would become commonplace with a membership of such undesirables, and your splendid beginning eventually run to a post mortem. I could then hear business of singing "Requiem." In conclusion, I should say and propose that at the reading of a candidate's name, a set of questions be asked of members, as follows:

Who knows this candidate?

Where and under whom has he served?

How long?

And as much other information as can be gotten together in the above line of questioning.

Trust the members to answer, as they know not what time it may occur to them. Each and every one will take an interest in this step because it is vital.

It will also command the respect of our employers, for they will be protected in being educated to know that they are getting what they are paying for.

This is merely a starter, open for discussion, pro and con, and if it has done the slightest good I will be amply repaid in the sense of knowing I have done my duty. I know I will be severely criticized, condemned and well wished—but one cannot expect to please everybody.

In intelligent argument there is undoubtedly education of a desirous sort, so therefore let us cast aside bitterness and sarcasm and enter into the spirit of this argument, with a desire to do good to the greatest and most deserving number of the A. E. S.

MAKING A BRONZE SOLUTION.

By O. L. Stephens, Dayton Branch.

There are many formulae on bronze solutions and also a great deal of literature written on the making and management of them. There are also a great many platers who have their own particular way of making a bronze solution and that way only known to them. When the time comes for a novice to do this kind of plating he is at a loss to know how to proceed and what formula to use for his particular class of work, and right here the mistake is made, as there are no bronze solutions made for plating any particular kind of work. There is only one bronze solution, and that is the one that plates bronze, whether one is working on hard or soft metal, the solution is the same as all other bronze solutions, and if not, instead of getting good bronze deposits one will have a lot of useless trouble.

A plater often hears of different things to put in the solution

to get certain results and when he cannot seem to make it work the way he wants to, he begins to add a few of those so-called "dopes." Still not receiving any relief, he is under the impression that not enough has been added, so he makes further additions until he becomes so confused and discouraged that he gives the thing up in despair, yet there may have been just one simple rule which the operator did not know, and which, undoubtedly, was causing the trouble.

The better class of platers do not owe their skill to the formula they use for making a bronze solution, but to the fact of knowing how to operate them, in other words, he has got to live with them every day, watch the different actions that occur that may be caused by different things.

We all know that bronze solutions are composed of carbonate of zinc, carbonate of copper and water, that's all. The only big proposition in operating a bronze solution is in maintaining the color, and this is very easy when one becomes acquainted with his solution. The color is very easily changed by raising or lowering the temperature of the solution, and there is only one way to hold the temperature of the solution, and that is to install heating pipes in the tank, which enables one to hold the temperature at any degree desired.

I remember a case that happened a good many years ago with a bronze solution that was plating a light yellow color, almost yellow brass; this occurred when the man who regularly operated the solution was away. The man who had it in charge undertook to remedy the trouble, and naturally added copper. He kept on adding copper without materially changing the color. I would be safe in saying he added one hundred pounds of copper carbonate without changing it in the least and was forced to give it up until the other man returned. All he did was to take a barrel of solution out of the tank, put it under the steam pipe, boil it, put it back in the tank and the solution started to plate red. Now the one thing I wanted to bring out was that heat is the essential thing in a bronze solution to hold the deposit to a red color. By using heat and replenishing the solution with copper and cyanide, we are enabled to keep the desired color without the use of very much zinc. In nearly all cases when the solution is plating too red we are able to bring back the correct color by adding free cyanide. I do not mean to say that we are able to keep the color by not using some zinc, for we cannot; it should not be used, however, until it is absolutely necessary. By the addition of copper and a little free cyanide to the bath we are able to get a heavier deposit and the solution is more easily operated. Copper forms the body and makes the bright finish. Without the excess of copper the color would be dull. When a solution is plating streaky, in nearly all cases, it indicates that it contains too much zinc; this condition can be overcome by copper additions.

Sometimes all the conditions of the solution may be perfect and still two different colors will appear on the cathode; this is the

result of too much current. We run our solutions at about three and a half volts on an average.

It has been my experience, in operating bronze solutions, that the current has very little to do with the color. I have also found that, with a solution standing at from 22 to 25 degrees Beaume, when the current is too strong, the deposit has a tendency to raise on the corners after a certain length of time. This can also be attributed to improper cleaning but more often is caused by an excess of current.

We are operating 950 gallons of bronze solution at our factory and have had very little trouble in the eight or nine years we have had them in use. I believe that when anything is added to a solution that will destroy the cyanide the backbone of the solution has been killed. It causes the anodes to coat over, leaving them powerless to dissolve and kills the conductivity of the solution.

I cannot say how much copper, zinc or cyanide to use to a gallon of water as I have never weighed them. My method of making a bronze solution is to first make a good cyanide copper solution standing about 12 and then adding zinc until the correct color is obtained. I believe this to be the safest way to make it. The anodes should remain free from scum, with the exception of a little oxide on them, which, when rubbed over with the finger, shows the bright metal underneath. It is the hard scum which sticks on and cannot be removed, only with much effort, that is the bad feature. When this occurs, the cyanide in the solution is becoming inactive and, if it cannot be remedied by the addition of fresh cyanide, part of the solution should be taken out and water and cyanide added. This way is always to succeed.

Don't be under the impression that a bronze solution has a day off once in a while, or that it cannot be right at all times; if the solution works well one day there is absolutely no reason why it should not work properly every day. The fault in this case is usually due to the plater; he must be able to find the fault at once and this can only be learned by keeping at it. Study your solution in your own practical way and you will always succeed.

SLIME IN NICKEL SOLUTIONS.

By Henry Baum, Cincinnati Branch.

Cincinnati Branch has declared war on one of its members (myself) in its discussions on nickel solutions and nickel plating. The rub came when the question arose, what do you do with the red slime, deposit or sediment that lies at the bottom of a nickel solution? Matters became very interesting and all began to delve into the mysteries of that which lies at the bottom of the tank, and, judging from the expression in this respect, it was found that mostly all platers throw this slime or red deposit away. I claim that I do not throw mine away but use up every particle of that sediment which I believe to be the cream of any and all solutions, be it gold, silver, nickel or copper. The question arose and applied itself to me, why do you want to use this red deposit when

the claim is made that it contains impurities in the form of iron and is detrimental to the correct workings of a nickel solution? My claim is that, whenever a nickel solution has no red bottom or slime, it does not work well, but when sulphuric acid or some of its bases in solution dissolves this red deposit and takes it up into solution there is a continual round of precipitating and redissolving taking place while the work is being plated, and while this is occurring, all the other agents contained in the solution also have their respective parts to play in an electrolytic manner. I also claim that electricity has nothing more to do with the nickel after it has broken up the elements, but that they all, with one accord, act chemically and go to their distinct and respective places to carry on the process over and over again, and thus a deposit of metal falls physically upon the work. For example, take the ordinary copper dip, it needs no dynamo, no current, no voltage or amperage, still a deposit takes place; and yet there is an electric current generated strong enough to plate chemically, which is due to the iron dipped in the solution forming the cathode side and the copper in solution forming the anode side and at the same time precipitating itself upon the work. Could there be an electrolytic fusion in this respect? When the process of nickel plating has gone so far and the metal is about to be deposited on the work, I call it "electrolytic fusion" of metals. I have also my doubts in regard to the "electrolytic fusion" theory, even though I did christen the same, but get out your microscope and see whether any fusion does take place, just to bring out experience, tact, or talent, that is my object, and for this reason we meet and come together to be enlightened on all such matters.

The question was also asked, Why so much acid in excess of neutrality? It is said in answer, that it is impossible to have a strictly acid, alkaline or neutral solution. The elements in a plating solution are constantly changing and being set free electrolytically, each element going to its chemical affinity to form an acid or base. Thus a metal, an acid or an alkali is produced, which acts upon anything soluble or is taken up in solution.

In three stages, I find, first, that if the solution contains an excess of acid, this red slime becomes so active that it deposits itself upon the surface of the work being plated and even peels to a certain extent. Second, if the solution is neutral, everything works fine, good color, heavy deposit and this red slime is continuously rising and falling, due to chemical and electrical energies. Third, if the solution should be found alkaline, the deposit looks hard and frosty, even spots in places and will not deposit evenly, and when this is going on, the red slime is going up into solution, too, causing a poor deposit. When alkalinity has gone too far, plating stops entirely. This is due to the red slime not precipitating fast enough to work up to the standard of perfection.

DUPLEX COPPER PLATING.

By August Heck, Philadelphia Branch.*

In the Hardware Industry many articles are manufactured of which the basic metal is either cast iron or rolled steel. To give these articles a decorative effect and durable appearance, they are plated with brass, bronze, copper or oxidized. The copper plating is mostly done with two solutions—first, in an alkaline bath, to be followed by an acid copper deposit. This process is known as Duplex Copper Plating.

The sample night latch cases, herewith shown, are plated for ten minutes in an alkaline bath composed of water, 1 gallon; carbonate of copper, 6 oz.; bisulphite of soda, 3 oz.; 30 per cent. solution sal-soda, 4 oz.; cyanide mixture, 8 oz.; 40 per cent. cyanogen, aqua ammonia, 1 oz. A very satisfactory bath could be made up with cyanide of copper at less cost, as follows: Water, 8 gallons; cyanide of copper, 4 oz.; bisulphite of soda, 6 oz.; 30 per cent. solution sal-soda, 4 oz.; cyanide mixture, 5 oz.; aqua ammonia, ½ oz. Bath heated to not more than 120 degrees, as it will decompose rapidly if allowed to boil.

Work taken out of this bath should be rinsed in clear water and a sulphuric acid pickle (1 part acid to 10 parts water) and then transferred to the acid copper bath, to remain therein for twenty-five minutes. The acid copper bath is composed of 20 per cent. blue vitriol solution, with 1 per cent. sulphuric acid. To a 200-gallon solution should be added 10 to 12 pounds sulphate of nickel. This bath has given great satisfaction for the past 10 years. Seventy-five of these night latch cases, of a cathode surface of 750 square inches, form a batch. Distance from anode to cathode 5 inches. Electromotive force five volts. Current density 125 amperes, agitating the electrolyte with compressed air. A boy plates 900 of these pieces in ten hours. After oxidizing they are scratch-brushed and the high parts felt-buffed. I claim the deposit will adhere better, is more dense and has the velvety appearance so much appreciated by Ormolu gilders.

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*Foreman plater, Miller Lock Co., Philadelphia, Pa.

WHAT THE BRANCHES ARE DOING

NOTE TO THE SECRETARIES—All correspondence for this department must be in the hands of the editor by the 15th of each month.

SUPREME SOCIETY

Meets first week in June, 1915, at Dayton, Ohio. Secretary, Walter Frame, 507 Grand Avenue, Dayton, Ohio.

NEW YORK

Meets fourth Friday of each month at Broadway Central Hotel, New York City, 8 P. M. Secretary, Joseph Minges, 148 Schenck Avenue, Brooklyn, N. Y.

The regular monthly meeting was held September 25th with a good attendance. An interesting evening was spent in discussing topics dear to the plater and samples of various hardware finishes and also samples of nickel on steel and nickel on zinc were exhibited.

The subject of testing chemicals used in the plating room was taken up, with the result that Mr. Voss promised to present a paper on the subject at our next meeting, which will be held October 23d.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Penna., 34th and Spruce Streets, Philadelphia, Pa. Secretary, Philip Uhl, 2432 North Twenty-ninth Street, Philadelphia, Pa.

The regular monthly meeting was held Friday, October 2d, with J. L. Dinan presiding and a good attendance.

After the routine business of the meeting was disposed of, Mr. Chas. H. Proctor, who honored us with a visit, was called upon and made an appropriate address, which was cordially received.

Mr. August Heck read a paper on Duplex Copper Plating; he also showed samples of different finishes, using sulphate of nickel as one of the ingredients in the acid copper solution.

P. J. Startzman was accepted to membership on demit from New York Branch.

BRIDGEPORT

Meets third Friday of each month at the office of the Brass World, 260 John Street, Bridgeport, Conn. Secretary, Nelson Barnard, 858 Howard Ave., Bridgeport, Conn.

At the last meeting of this branch we had papers read on the rusting of steel and the best methods of its prevention.

We expect to have a paper each month on something of interest. Our next paper will be "Electro-plating on Electro-Galvanized Steel," and should prove of interest, as at the present time it is not being done very successfully.

We added three new members in September and expect to have more at the October meeting.

CHICAGO

Meets fourth Saturday of each month, 8 P. M., Western Building, Randolph Street and Michigan Avenue. Secretary, H. E. Willmore, 5911 South Boulevard, Chicago, Ill.

The regular monthly meeting held September 26th was more than usually well attended. President O. E. Servis occupied the chair.

Mr. Louis Schulte presented an able and interesting paper dealing with "The Spotting Out Problem," in which he advocated a large excess of free cyanide in the alkaline solutions as a preventative of this trouble. He contends that it is caused by the electro-deposition of the metals of the alkaline earths, such as sodium and kalium, contained in the solution. Mr. Schulte is of the opinion that "spotting out" can be overcome by precipitating the carbonates from solution by the use of salts of barium.

Mr. W. T. Donnelly read a timely paper entitled "A Condition After Which, What?" This paper was presented in the form of satirical drama, in which the author directed attention to matters of vital interest to the society and its members. His contentions were well founded and created considerable discussion. This paper shows the necessity of a stricter examination of prospective members as to their eligibility for membership in the A. E. S. Mr. E. Troxler, member of Newark Branch, was a visitor and spoke of the good work his branch was doing.

NEWARK

Meets first and third Friday of each month, 8 P. M., 47 Bank Street, Newark, N. J. Secretary, Chas. A. Stiehle, 46 West Madison Avenue, Irvington, N. J.

The regular meeting was held October 2d with H. H. Smith presiding. This was certainly a gala occasion, it being the first meeting in our new rooms. The members were much enthused by the appearance of the equipment and are planning for extensive research work.

We were honored by a visit from the New York Branch of Supreme Treasurer John E. Sterling, President Thomas B. Haddow, William Schneider, William Voss, each addressed Newark Branch, offering their congratulations.

Mr. Haddow delivered the first lecture on the subject, "How to Determine the Amount of Free Cyanide in Any Cyanide Solution," demonstrating each statement. Mr. Frederick Piske was elected as an honorary member.

DETROIT

Meets first Friday of each month at Prismatic Hall, 140 1st Street. Secretary, B. E. Miller, 545 Townsend Avenue, Detroit, Mich.

The regular monthly meeting of October 2d was called to order with President J. Schultz in the chair and a good attendance.

Through the courtesy of Librarian Shepherd, the following questions and discussions were brought before the meeting, and

it was decided that streaks in cyanide copper plating, when not in the form of "shoots" from dirt in holes or depressions, are caused by impurities in the solution and not by cyanide or copper content or by too high a current which will show on edge of cathode. A streaking solution with too little free cyanide will stop streaking on the addition of hyposulphite of soda, which further reduces the amount of free cyanide, thus showing that the addition of cyanide is not the remedy.

That pitting in nickel solutions occurs more readily in a high density solution and that it occurs only when the hydrogen gas bubbles do not automatically remove themselves or are mechanically removed.

To prevent the pitting of nickel on cast iron, Mr. Davenport's theory was that, in passing castings through the acid dip and water, sulphate of iron was carried into the nickel solution, which in time caused pitting, and in order to overcome this diseased condition of the solution or deposit, another preliminary dip composed of 1 pint of ammonia to 50 gallons of water was being used very successfully by the company he is with. Copper and brass not being run through an acid dip before nickel plating, why should it come out pitted? This question is still open for discussion.

Dark or streaky nickel deposit is caused by copper in solution or want of conductivity. The latter may be remedied by the addition of single nickel salts, sal-ammoniac, boracic acid or by increase of current.

That brittle nickel deposits are caused by an excess of sulphuric acid in solution. Boracic acid making it the reverse, even when used to the extent of four or five ounces to the gallon.

A new laboratory committee was appointed with instructions to see what can be done in the matter of securing a place for making experiments in electro-chemistry.

Before bringing the meeting to a close President J. Schultz expressed his thanks to Librarian A. E. Shepherd and Mr. Davenport for the interest they had taken in the different subjects that were under discussion.

Mr. B. E. Miller was appointed secretary pro tem on the resignation of Mr. George Kutzen.

TORONTO

Meets fourth Thursday of each month at Occidental Hall, Bathurst and Queen Streets. Secretary, Ernest Coles, P. O. Box 5, Coleman, Ont.

Toronto Branch held its regular meeting Thursday, September 24th, with President Magill in the chair and a good attendance.

Mr. W. S. Barrows and Mr. Wells, Jr., entertained the members with a talk on the three-wire system, illustrations being sketched on the blackboard. This subject seemed to lose all of its complex formation when explained in simple language by the speakers. All points in regard to this subject were explained and the opinion

of the speakers, which singularly was reverse, on the merits of the system given. Numerous questions were asked, all of which were promptly answered.

CINCINNATI

Meets once each month at Dennison Hotel, Cincinnati, Ohio. Secretary, F. H. Nordman, 720 Froom Ave., Cincinnati, Ohio.

At the regular meeting held October 2d we had as a visitor Mr. R. H. Sliter of the Celluloid Zapon Co., who usually has some subject to discuss. This time it happened to be gold solutions. This subject will be more thoroughly discussed at our next meeting.

BUFFALO

Meets first Saturday of each month at the University of Buffalo, 8 P. M. Secretary, John G. Murphy, 71 Dingens Street, Buffalo, N. Y.

The regular monthly meeting of this branch was held Saturday, October 3d, at the University of Buffalo. The meeting was well attended.

Prof. Childs was present and gave a graphic description, or as he expressed it, "A mechanical conception of valence," which he illustrated by means of a set of blocks. He gave this topic to make clearer the talk of Librarian Shepherd on the way to use the table of Electro-Chemical Equivalents. The librarian explained the method of using the table and also a table for making up the weight of deposit as it should be theoretically, and explained how to adapt it commercially by checking the actual weight obtained and using that as the factor for the percentage of what the actual weight is in the shop.

We have six members taking the special course at Tech. High School, and a review of the work done was given for the benefit of those who were not with us. Since the class started there have been no absentees, which looks like business.

It was unanimously resolved that, at no time in the history of Buffalo Branch, would any officer be paid, except in the honor he obtained, and if his job was too big for him he could ask the others to help him with the necessary work.

Also, that the office of president was vacant and should be filled at the next meeting and hereafter to be eligible to office the member should have dues paid in advance for the fiscal year, present officers to pay up by next quarter.

That Buffalo Branch buy or rent a typewriter.

That Mr. Warbeleski be elected treasurer of Buffalo Branch.

ROCHESTER

Meets second and fourth Friday of each month at University of Rochester. Secretary, C. V. Haring, 603 Dewey Avenue, Rochester, N. Y.

The interest shown in the branch has been universal this fall. A banquet was held at the Osborne House and was one of the events of the season. Wm. Schneider was in town and was given

a seat at the head of the table and as usual "Bill" was boosting the A. E. S. Appropriate remarks were made by President Harper. Mr. Frank P. Kalb, our worthy instructor, outlined a plan for the winter's work. Mr. Hesselink proposed that we transpose the letters in the Society's emblem and add the letter T, making it spell eats. It is needless to say this was unanimously adopted.

We were also pleased to have our Syracuse member, Mr. J. J. Phelan, with us, and he also spoke of the general good the society is doing.

An open meeting was held on the 9th of October. Many beautiful samples of work were exhibited and much interest shown by visitors. We expect to add several new names to the roll through this display of the craft.

Mr. Kalb gave a demonstration of a method of ascertaining the metallic contents of a nickel solution.

President Harper gave a talk on the aims and objects for which the society stands. This meeting was so successful that it was decided to hold another in the near future and invite our manufacturers in to see the display of up-to-date finishes which we hope will have the effect of opening the eyes of the employer to that little room off in one corner of the factory that has been neglected and considered a necessary evil. It is not so much the article, but the finish that usually gets the customer.

DAYTON

Meets first and third Wednesday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Alphonz Lamoureux, 500 East First Street, Dayton, Ohio.

ST. LOUIS

Meets fourth Saturday of each month at Public Library Assembly Rooms. Secretary, H. H. Williams, 2134 Nebraska Avenue, St. Louis, Mo.

MILWAUKEE

Meets first Friday of each month at Eagles Hall, 137 Second St.. Secretary, E. C. Yaeger, 962 Ninth St., Milwaukee, Wis.

CHANGE OF ADDRESS

Joseph Emmett.....3341 Southport Ave., Chicago, Ill.
J. H. Hall.....253 W. 60th St., Chicago, Ill.
E. Troxler .....6040 Blackstone Ave., Chicago, Ill.
E. S. Thompson.....1410 E. 89th St., Cleveland, Ohio
J. C. Cripps.....Lindsay, Ontario
W. G. Caslor.....1633 Maple St., Vancouver, B. C.
M. W. Baldwin.....4040 Van Buren St., Chicago, Ill.
Geo. J. Kutzen.....226 E. Elizabeth St., Detroit, Mich.
J. Jorden.....221 Washington St., Susquehana, Pa.
E. Beudy .....175 Mt. Vernon Ave., Rochester, N. Y.
P. Geiger.....411 S. 14th St., Reading, Pa.

ELECTED TO MEMBERSHIP

BRIDGEPORT—

Wm. J. McKeen.....39 Camp St., Bridgeport, Conn.
Stephen J. White.....251 Park St., Bridgeport, Conn.
Harry de Joannis.....260 John St., Bridgeport, Conn.

PHILADELPHIA—

John A. Gottsman....150 Pierce St., N. W., Washington, D. C.

The official button of the American Electro-platers' Society, adopted by the Supreme Society, is now ready and can be obtained from C. V. Haring, 603 Dewey avenue, Rochester, N. Y., at the following prices: Sterling Silver, 23c each; Rolled Gold, 31c each; 10 Karat Gold, $1.25 each; 14 Karat Gold, $1.55 each.

WINNING OUT.

They tried him in a hardware store,
But he was of no use;
He got a job with Tailor Moore
And one week cooked his goose.
As hotel clerk he tried to work,
But made friends like a thistle.
No one of these things could he do—
But he could whistle.

He for the druggist vainly tried
To tend the soda fount;
Himself to painting barns applied,
But proved of no account.
Said Butcher Bland: "My trade won't stand
His selling bone and gristle."
They said he wasn't worth his salt—
But he'd just whistle.

With trills, with runs, with warbles clear
His skill is now displayed;
In vaudeville year after year
His big success is made.
Success to spell, do one thing well—
This tale with truth doth bristle.
If you no calling yet have found,
Cheer up—and whistle!

—Chicago Daily News.